

GOULEY (J.W.S.)

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LITHOTRIPSY

AT THE SAME SITTING, IN A PATIENT SEVENTY-NINE YEARS OF AGE;

WITH REMARKS ON

RAPID LITHOTRIPSY,

AND ON

THE EVACUATION OF DETRITUS FROM THE BLADDER.

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INTERNAL URETHROTOMY AND LITHOTRIPSY

AT THE SAME SITTING, IN A PATIENT 79 YEARS OF AGE; WITH REMARKS ON RAPID LITHOTRIPSY, AND ON THE EVACUATION OF DETRITUS FROM THE BLADDER.

FOR the facts connected with the previous history of the case detailed below, I am indebted to Dr. Ramon L. Miranda, who obtained them from the patient. I take great pleasure here in making my acknowledgments to Dr. Miranda for his valuable aid in the management of the case.

Doctor ——, an eminent surgeon of Havana, Cuba, seventy-nine years of age, of spare build, but of great energy, has of late years become invalided on account of dysury and of vesical irritation; but he has nevertheless been able to perform his usual labors, and his general health has suffered but little. Without antecedent urethritis, he has had symptoms of urethral stricture ever since 1836, when J. Cloquet, of Paris, detected a narrowing in the pendulous portion of the urethra, for which, however, nothing was done, and he seldom suffered more than ardor in urination, principally during the night, or after having taken more than his wonted exercise.

On the 30th of June, 1878, after an obstinate constipation of four days, he was seized with complete retention of urine, from which, in twenty-four hours, he was relieved by the introduction of a gum catheter No.

Compliments of

J. W. S. GOULEY, M. D.

3 (French scale), which was kept in for three days. Its removal caused much pain, owing to alteration of its surface by the urine. It was replaced by another catheter, which was renewed every day, but retained only from four to eight hours. This was continued eighteen days, and the bladder regularly irrigated with sundry solutions—of acetate of lead, phenic acid, etc. Baths, cataplasms, leeches to the perineum, etc., were also employed. From that time he began to experience, during each act of urination—which was unduly frequent and difficult—much pain at the anus and in the urethra, especially in the fossa navicularis, and the urine became purulent. These symptoms have ever since persisted with more or less severity. He has never had pain in consequence of riding on rough pavements, and twice he rode one mile in a carriage to see me, without suffering the least inconvenience. He had consulted many surgeons, most of whom were of opinion that his troubles were caused by prostatic enlargement and urethral strictures. About a year before I saw him, gradual dilatation was suggested, and then internal urethrotomy, which was done in September, 1878, with Maisonneuve's urethrotome. The incision made was very superficial ("nothing more than a scarification"), and a "straight metallic sound, No. 11 (French), was introduced with much force—causing intense pain—without entering the bladder." In the course of an hour the extravasated blood in the surrounding connective tissue formed a tumor on the right side of the body of the penis, extending to the pubes; this hæmatoma gradually disappeared, but left at the base of the penis an induration which has remained very tender to the touch, and which has seemed to the patient to be the starting-point of the great pain he has suffered while urinating.

Continuous dilatation was afterwards tried with

Benique's catheters, from No. 6 to No. 12, changing the instrument every twenty-four hours. During this course of treatment of twenty-one days there was the most profuse suppuration, and finally on the twenty-first day a free haemorrhage. From that time until July, 1879, a sound was introduced every second day, but without the slightest benefit. The only relief he experienced was from frequent vesical irrigations with tepid water. Meanwhile the bladder was several times explored, but no calculi were detected; still the patient himself thought that there might be stones. Once the bladder was injected with a strong solution of nitrate of silver on account of "recto-vesical neuralgia." This he thinks made him much worse. He finally concluded to come to New York to be treated, and on July 21, 1879, called upon me at the suggestion of, and with, Dr. Ramon L. Miranda. I detected, with a soft bulbous bougie, three urethral strictures—one in the fossa navicularis, the second at two inches and a half, and the third at four inches from the meatus; this last admitted No. 6 (Eng.). I made dilatation to No. 8 steel sound, and, wishing to ascertain whether he could empty his bladder, I passed a No. 6 (Eng.) Mercier soft catheter, and as soon as it entered the bladder grated against a hard body, which I thought was a stone; very little urine flowed—not more than an ounce—and no bleeding ensued. Rectal exploration revealed hypertrophy of the prostate to double its normal size. There was no median prostatic hypertrophy, as afterwards ascertained. My mind was made up as to what should be done, but as the patient was very nervous and timid from his previous sufferings, and as, besides, he required preparatory treatment, I said nothing of the necessity of a cutting operation, but simply advised daily vesical irrigations, and the introduction of sounds partly to dilate the strictures, partly to blunt the extreme sensitive-

ness of the urethra, and enable me the better to explore the bladder. Full doses of quinine were prescribed. On the following day I passed a No. 8 sound, and as it entered the bladder its point came in contact with a calculus. Dr. Miranda took the sound, and also felt the stone. I then introduced a Mercier catheter and irrigated the urethra and bladder with a solution of borate of soda. This was repeated daily until August 5th. Twice during that time I was obliged to push back with the sound a calculus which was engaged in the urethro-vesical orifice, where it had been creating much irritation for several hours. Nos. 9, 10, and 11 sounds caused much pain, which was, however, well enough tolerated, and no rigor, no haemorrhage, at any time followed the use of these instruments.

He rested each day, but was able to call at my house to be catheterized. I thought further attempts to dilate the strictures out of the question, as they were extremely resilient, and advised internal urethrotomy and lithotripsy at the same sitting, and the 7th of August was appointed for the day of operation. A cathartic on the 6th, and an enema on the morning of the 7th were ordered. Assisted by Drs. Miranda, Lewis, Roberts, Sayre, Jr., and Goodwillie, who administered nitrous oxyde, I made free division of each of the three strictures, from behind forward, with Civiale's urethrotome, and was able to introduce a steel sound ten millimetres in diameter; then, with a flat-bladed lithotribe, seized and crushed four phosphatic calculi, one of half an inch, and three of three-eighths of an inch in diameter. I also caught and crushed seven fragments (some of these may have been small stones) each of a quarter of an inch in diameter, and four of one-eighth of an inch—fifteen seizures in all, including the four stones. The lithotripsy proper occupied less than five minutes, during

which time the lithotribe was twice introduced, and brought out charged with detritus. I noticed, while passing the instrument, that its point became engaged in the mouth of an old false route on the right side in the sinus of the bulb, but by altering its direction it went in without further impediment, and in the subsequent introductions of all instruments I always succeeded in avoiding this cul-de-sac. There were columns in the bladder, from hypertrophy of the muscular coat. Aspiration with Bigelow's elastic pear was then made, but very little detritus was brought out. The entire operation—that is to say, the exploration, the urethrotomy, the catheterism, the aspiration of detritus, etc., lasted twenty-eight minutes. There was very little loss of blood, and the immediate effects of the anæsthetic passed away rapidly. In two hours the bladder was emptied by means of a catheter, and in three hours after, catheterism was again done with a No. 14 (Eng.) Mercier gum catheter, which was then plugged and retained for seventeen hours. Every three hours the plug was removed, and the urine which flowed was at first fetid and tinged with blood, but soon became clear. The catheter was replaced by another, which was retained only seven hours. There was some tumefaction of the penis, which on the fourth day entirely disappeared. He was up on the seventh day. Nine grains of detritus had been obtained, partly from the beak of the instrument, partly by aspiration, and in the first two or three days eight grains came away through the catheter. Probably an equal quantity was lost, as he urinated spontaneously several times. Free doses of quinine were administered during the whole treatment, and the bladder was frequently irrigated with a solution of boric acid of soda. As on the day he got up (Aug. 14th) he had a considerable amount of irritation at the urethro-vesical orifice, and the old

ardor at the anus and in the fossa navicularis, I made an exploration of the bladder with a flat-bladed lithotribe, and seized and crushed three fragments (or small stones) of a quarter of an inch in diameter, brought out a beak full of detritus, and, with what was passed through the catheter, obtained in all eight more grains (the detritus was never weighed until it was quite dry); at the end of two days no more detritus came away. On August 19th I sent him to take a ride of four miles on rough pavements; when he returned the urine was slightly tinged with blood, and he felt the old pains in the perineum and urethra. On the 20th I made a third exploration of three and a half minutes, and could find only two fragments, one of a quarter, the other of one-eighth of an inch, and brought out a beakful of detritus, which, when dry, weighed three grains. The total amount of detritus collected weighed, when dry, twenty-eight grains. After this he had no more symptoms of stone. Still, in two days I made another exploration, and in two more days a final and most thorough examination with the lithotribe, without finding any trace of calculous concretions. Steel sound No. 15 (nine millimetres in diameter) had been introduced every second day, and he was soon able to pass it himself. During the whole of this time he never had a rigor, nor indeed any other untoward symptom. On account of some remaining urethro-cystitis, I several times irrigated the whole urethra and bladder with a very weak solution of nitrate of silver, which produced the desired effect.

Before his departure he was able to urinate in a large jet, which was well propelled for a man with a large prostate, and on several occasions, immediately after urination, I passed a catheter, and only two or three drachms of urine came away. The patient sailed for Havana on Sept. 4th, in better condition

than he had been for a year at least, promising to empty his bladder twice daily, and to make an irrigation with the baborate solution, and in case the urine should become alkaline, to use acetate of lead, as the principal means of preventing the recurrence of phosphatic calculi. Once a week he is to introduce his No. 15 steel sound, to prevent recontraction of the strictures.

COMMENTS ON THE CASE.

I have selected for comments a few from the many points of clinical interest which this case possesses.

The patient was known to have an ancient urethral stricture, which had contracted so slowly as to give rise to but slight dysury at the end of forty-two years, and when at last (in June, 1878,) retention of urine occurred, it was caused not by the stricture, but very distinctly by acute engorgement of the already hypertrophied prostate, resulting from the obstinate constipation of four days.

The two courses within a year of continuous dilatation had the effect of making the strictures worse, more resilient, though a certain amount of dilatation was maintained by frequent catheterism. Nevertheless, in the end of July I found it impossible to dilate them beyond No. 11 (English scale). This, with the great sensitiveness of the canal, rendered ordinary lithotripsy impracticable. It does not appear that cystitis existed prior to June, 1878; this complication was provoked by the presence of the catheter, which was retained three days, and from that time date the vesical symptoms which became so distressing in 1879.

I have every reason to think that the age of the stones which I crushed in August, 1879, was thirteen months, and firmly believe that their nuclei were the concretions which fell from the retained catheter at

the moment of its withdrawal. But it is known that such phosphatic calculi grow rapidly, and it might be asked whether in a year's time they would not have attained a greater size? Without intervention, most decidedly yes; they would have been each at least one inch in diameter but for the fact that the urine was drawn off and the bladder for a long time irrigated every day, and occasionally too with a solution of acetate of lead, than which there is no better reagent for the disintegration of phosphatic calculi. This, it seems to me, is a sufficient explanation of the diminutive size of the stones.

Two symptoms of stone were wanting in this case: frequent haematurias, and pain while riding in a carriage; but these symptoms are often absent in the aged. Two operations were indicated: internal urethrotomy and lithotripsy. Thinking that lithotripsy would be impracticable without the urethrotomy, principally on account of the great urethral irritability, I decided to combine the two operations, and, with the aid of an anaesthetic and of aspiration, hoped to be able to do them both at a single sitting of not more than twenty minutes, but succeeded in extracting only a very small amount of detritus, and two additional sittings were necessary to complete the operation. These sittings were, however, very short and well borne, though it was difficult to seize the last fragments owing to the bladder being hypertrophied and columnar, and neither anaesthetic nor aspiration was used. The aspiration was here a failure, but I am sure that if I had persisted and made another introduction of the lithotribe I would have succeeded in removing the entire detritus; but I did not wish to prolong the sitting.

In another case I also failed to extract the detritus by aspiration, but it was because there existed a false route in the deep urethra which absolutely prevented

the passage of any of the catheters belonging to Bigelow's aspirator. The lithotribe was, however, always introduced with ease and all the detritus evacuated through one of Tiemann's India-rubber catheters. Six sittings were required, and the patient made an excellent recovery without having suffered the slightest untoward symptom.

In a third case, on account of a small oxalate of lime calculus which had caused inordinate vesical and urethral irritation, I employed anæsthesia, and aspiration with Bigelow's bag, and at one short sitting completely relieved the bladder of the detritus made by several crushings of the hard concretion.

Long sittings are justifiable in many cases, but I would not be willing to resort to them in aged persons, such as the patient of seventy-nine years who is the subject of these remarks; in like cases I believe that several (three, four, or five) sessions of one or two minutes, without anæsthesia, are safer than a single long one of an hour or more, with the aid of an anæsthetic.

RAPID LITHOTRIPSY.

Among the requisites for the successful performance of lithotripsy is an ample urethra, or one that can be safely and easily rendered so, that the detritus may be expelled or extracted without inflicting serious injury to the canal. This operation was for a long time believed to be contra-indicated in cases of narrow or resilient strictures of the deep urethra; but since Heurteloup gave the first impulse to rapid lithotripsy and showed its applicability to such cases after dilatation or internal incision, a change of opinion has gradually come about, so that at present it may be considered good surgery, in case of obstinate stricture complicating a calculous affection, to make divulsion or internal urethrotomy, and at the same

sitting to introduce a lithotribe, to crush the stone, and forthwith to extract all the detritus or the greater part of it, without molesting the wounded urethra by gravelly matter or by urine.

I beg leave to take this opportunity to state a few facts bearing upon the history of rapid lithotripsy, and also of the aspiration of detritus from the bladder, as they are now both attracting the attention of lithotriptists. In tracing back the history of the sundry methods of lithotripsy carried out as they were at first by ponderous engines—so to speak—with drills, saws, scrapers, and many other devices to reduce vesical stones to dust and small fragments, at a time, too, when anaesthetics were not used, it has seemed to me marvellous that this operation should have so formidably rivalled lithotomy, and should be what it is, and no longer militant. The truce between the two ended in its becoming firmly established as a surgical procedure of the greatest value, equal to lithotomy and often combined with it.

To bring lithotripsy to its present state has required the best thoughts and labors of many. No one man has accomplished the task. Civiale, Amussat, Leroy, Brodie, Jacobsen, Heurteloup, Mercier, Fergusson, and others of the same period, have performed the bulk of the work, and have established the great principles by which we are now guided. Minor details, but no new principles, have since been given, and from time to time modifications and improvements of existing instruments have been made by faithful students of lithotripsy. From an early period of the age of lithotripsy, nearly all of those surgeons above named began their endeavors to simplify the operation and the instruments necessary for its execution, and to reduce it to one sitting. Prominent among these men was Heurteloup who, having recognized that angular fragments made by his percussor “often caused grave

accidents, wished to make it possible to extract them without danger." He experimented to that end for a number of years with a spoon lithotribe, which he had invented in 1832, and published in 1846 the result of his labors in a work bearing the title of "Lithotripsie sans fragments, au moyen de deux procédés de l'extraction immédiate ou de la pulvérisation immédiate des pierres vésicales par les voies naturelles." In his memoir of 1832, on the destruction of vesical stones by percussion, he says: "Lithotripsy is the art of crushing stones in the human bladder, in order that the powder and fragments may be expelled with the urine, or that their exit may be provoked by artificial means." To these artificial means he gave the name of Lithocnēsis, which signifies evacuation of the stone, from $\lambda\acute{\iota}\theta\sigma$, stone, $\kappa\epsilon\nu\omega\tau\varsigma$, evacuation. In this same work he cites Meyrieux as having been the first to attempt to make an instrument capable of reducing a stone entirely to powder, but says that this was without success. He also speaks of Tanchou's unsuccessful effort in the same direction, and of that of Vidal and of Amussat. These instruments were designed to grind or rasp the stone from the surface. Our countryman, Dr. E. M. Moore, has for many years been laboring to perfect an instrument designed to réduce vesical stones of considerable size to powder by attacking the surface. The object of all these procedures was to reduce lithotripsy to one sitting, but of half an hour or even much more, and it is very evident that each of these inventors was aware that the bladder containing a stone was often capable of tolerating for a considerable time the presence of instruments; but this tolerance of instruments had been fully demonstrated from the very beginning of the life of lithotripsy. The first operation of Civiale (1824), gave evidence of the greatest tolerance of the bladder to instruments and to angular fragments. This operation

required four sittings; two of twenty minutes each, one of thirty-five minutes, and a fourth short sitting whose precise time is not stated. After each of the first three sittings the patient had fever, but suffered no other serious complication; the treatment having lasted one month. Civiale naively says that, this being his first trial, he had not determined the length that could be given to each sitting. He afterwards, in many cases, shortened the sittings to ten, eight, five, and later, even to three minutes.

Heurteloup labored hard, but in vain, to generalize his operation of lithocenosis. No such operations can, or ever will be, generalized, for the exceptional cases will too often be more numerous than those which come within the rule. However, this operation of Heurteloup's with the spoon lithotribe is too good to have been set aside. With slight modifications I believe it can now be applied to a large class of cases. This very ingenious surgeon says, in his work on lithotripsy without fragments, that he has succeeded at one sitting of less than twenty-five minutes in extracting the entire detritus of a stone thirteen centimetres in circumference, weighing twenty-eight grammes; and that though, to accomplish this, he was obliged to introduce the instrument many times, the patient bore the operation well. He further says that larger stones have required two such sittings and sometimes more. In the work in question, he gives a summary of one hundred and twenty-four cases of stone treated by rapid lithotripsy with immediate extraction of the detritus, and I here reproduce the figures. Of these 124 patients, 69 required one sitting; 28 two sittings; 17 three sittings; 5, four sittings; 4, five sittings; and 1 six sittings.

With the spoon lithotribe, and with the aid of an anæsthetic, I believe it possible, in half an hour, to extract the greater part, if not the whole, of the detri-

tus of a calculus one inch in mean diameter. Very recently I felt justified in trying what I could do with a flat-bladed instrument, as I had no spoon lithotribe. Accordingly, on the 3d of October, 1879, I operated, somewhat after Heurteloup's plan, upon a patient sixty-one years of age, and here give the result. The man had, for two years, been under treatment for cystitis and was finally brought to me by a student of medicine. In ten minutes, after five introductions of the flat-bladed lithotribe, I had extracted thirty-two grains of the detritus of a stone five-eighths of an inch broad, half an inch thick, and one inch long. No anæsthetic was used, and the operation was well borne. The patient, who before had always been able to empty his bladder, did not suffer a single bad symptom, except that the sitting of ten minutes had caused enough shock to the bladder, and so disturbed its innervation, as to give rise to temporary paralysis of its muscular coat. I had foreseen this, and directed that he be catheterized at regular intervals. A few hours after the operation he passed a couple of ounces of urine, but this was evidently by the aid of his abdominal muscles and not by vesical contraction. The urine was drawn off four times each twenty-four hours. At the end of the third day he could urinate better, but was not able to empty his bladder. On the fifth day he emptied the bladder spontaneously. On the seventh day I crushed a remaining fragment three-eighths of an inch in diameter. He had passed, partly through the catheter, partly spontaneously, twenty-five grains of well pulverized detritus, and the detritus resulting from the last fragment weighed six grains. The total amount of detritus obtained was sixty-three grains.

I have known sittings of two minutes, in elderly men, to produce this paralysis, and now make it a rule to catheterize such patients every few hours after each

sitting, even if they soon urinate spontaneously, and do this to prevent over-distention of the bladder, which is so apt to cause atony. This precaution should always be taken after prolonged sittings, especially when aspiration of the fragments has been made; for this must surely cause more shock than simple lithotripsy.

ASPIRATION OF GRAVELLY MATTER FROM THE BLADDER, AND OF DETRITUS AFTER LITHOTRIPSY.

Repeated introductions of the spoon lithotribe which was brought out full of detritus were the only means that Heurteloup employed in his operation of lithocenosis; he says nothing of aspiration, though Cornay, of Rochefort, had in 1845 published his essay, "De la lithétréie ou extraction des concrétions urinaires," in which are figured several aspirators and large catheters, straight and curved, some of them open at the vesical extremity, some with lateral eyes, others with a single large eye on the convex or on the concave portion of the curved instruments, always within a fourth of an inch of the extremity. Some of these catheters are similar to those at present in use for the aspiration of detritus after lithotripsy. Cornay attempted to apply his methods of aspiration to lithotripsy, but was not successful. It might be urged that aspiration as applied to the extraction of small vesical concretions was known in Europe more than a hundred years ago, that Sanctorius used a syringe for making aspiration of the contents of the bladder, that aspiration of vesical calculi was centuries ago employed by the Egyptians and Arabs; nevertheless, the man who really deserves the credit for suggesting its use in combination with lithotripsy is Joseph Emile Cornay of Rochefort. One year after Cornay's publication, Sir Phillip Crampton's aspirating bottle for extracting calculous detritus became

known. Later, Mercier, of Paris, used for the same purpose an India-rubber balloon, with thick walls, at one end of which is a short glass cylinder, the recipient for calculous detritus, and at the other the necessary fittings for the distal end of a large catheter. I have in my possession the original instrument made more than twenty years ago by Charrière. This elastic balloon is described and figured by Mercier in his work, "Traitement préservatif et curatif des sédiments de la gravelle, de la pierre," etc., Paris, 1872, p. 373. After Mercier came Clover, whose apparatus was modified by Robert & Colin, and after Clover, Bigelow of Boston, who has given us an excellent aspirating elastic bag or balloon, which is constructed on a plan similar to that of Mercier. With Bigelow's apparatus more has been accomplished than with any of the others.

For the evacuation of calculous détritus Dr. Bigelow seems to prefer straight catheters. Rectilinear catheterism here, without doubt, has its advantages, but it is, in many instances, very objectionable, and the Doctor tacitly acknowledges this by also employing curved catheters, whose incurvation is not, however well adapted to certain cases complicated with urethro-vesical valvules. The eye in these curved instruments is near the point, so that the detritus has to follow the curve, a defect which, for aspiration, renders them inferior to the straight tubes. On this account I have had catheters made by Tiemann & Co. which combine Mercier's rectangular catheter with Bigelow's large-eyed straight tube. In other words, I have added the beak of Mercier's catheter, slightly modified, to the straight tube of Bigelow, and think I have thus obtained a better instrument than either. The form of an ordinary lithotribe's beak may be given to the vesical end of this catheter.

These various contrivances have caused surgeons to

think more about the possibilities of lithotripsy, and have induced many to attempt the operation with their aid in cases where, without them, lithotripsy would have been absolutely contra-indicated. While I think very well of the combination of aspiration with lithotripsy, with the improved aspirators, I believe that it can never supersede simple lithotripsy, lithotomy, or perineal lithotrity, which three operations will be in use as long as men have stones in their bladders. The indications and contra-indications of these various operations seem to me perfectly clear.

A few more words there are which I feel bound to say before dismissing this subject. *The combination of aspiration with lithotripsy is a more difficult and delicate operation than simple lithotripsy, and should never be undertaken except by a good lithotriptist. It is as safe in good hands as it is dangerous when improperly performed. Any surgeon who is not already an experienced lithotriptist and undertakes this operation is guilty of a great wrong.* I have uttered these expressions because some surgeons seem to have thought that anaesthesia and aspiration made the operation easy, and the consequence has been that death has resulted soon after the operation, and from the operation badly done.

